Claims

1. A method for stabilizing an amplifier, the method comprising:

(a) providing a stabilization module in electrical communication with the amplifier and comprising an open loop control system and a closed loop control system;

(b) using the open loop control system to modify at least one characteristic of an input signal received by the stabilization module and to pass control to the closed loop control system;

(c) using the closed loop control system to modify the at least one characteristic of the input signal; and

(d) providing the modified input signal to the amplifier.

2. The method of claim 1, wherein the at least one characteristic of the input signal comprises an amplitude of the input signal.

3. The method of claim 1, wherein the at least one characteristic of the input signal comprises a phase of the input signal.

4. The method of claim 1 further comprising using the open loop control system when an input power of the input signal is above a threshold level.

5. The method of claim 1 further comprising using the closed loop control system after using the open loop control system for a pre-determined period of time during which an input power of the input signal is above a threshold level.

6. The method of claim 1, wherein step (b) further comprises using the open loop control system to initialize filters in the closed loop control system based on outputs of the open loop control system.

7. The method of claim 1 further comprising measuring an input power of the input signal.

8. The method of claim 7, wherein step (b) further comprises using the open loop control system to modify the at least one characteristic of the input signal based on the input power.

9. The method of claim 8, wherein step (b) further comprises modifying the at least one characteristic of the input signal based on a value in a look-up table corresponding to the input power.

10. The method of claim 9 further comprising updating the look-up table based on outputs of the closed loop control system.

11. The method of claim 1 further comprising measuring an input power of the input signal and wherein step (c) further comprises measuring a first error between the input signal and a feedback signal representative of an output signal of the amplifier and a second error between the input signal and the feedback signal.

12. The method of claim 11, wherein step (c) further comprises using the closed loop control system to modify the at least one characteristic of the input signal based on the input power, the first error, and the second error.

13. The method of claim 11, wherein step (c) further comprises using the closed loop control system to adjust the first error and to adjust the second error.

14. The method of claim 1, wherein step (c) further comprises using the closed loop control system to account for at least one non-linearity introduced by the stabilization module.

15. The method of claim 1, wherein step (b) further comprises using the open loop control system to account for at least one non-linearity introduced by the stabilization module.

16. The method of claim 1, wherein the amplifier comprises a pulsed radio frequency amplifier.

17. The method of claim 1 wherein step (d) comprises providing the modified input signal to the amplifier of a magnetic resonance imaging system.

18. A system for use in a stabilization module for stabilizing an amplifier, comprising:

a first control module for receiving a first signal representative of an input signal received by the stabilization module, for generating a second signal capable of being used to modify a first characteristic of the input signal using an open loop control routine, and for sending a third signal capable of being used to pass control to a second control module; and

the second control module for generating a fourth signal capable of being used to modify the first characteristic of the input signal using a closed loop control routine.

19. The system of claim 18, wherein the first control module is capable of determining if an input power of the input signal is above a threshold level and of generating the second signal capable of being used to modify the first characteristic of the input signal using the open loop control routine when the input power is above the threshold level.

20. The system of claim 18, wherein the first control module is capable of determining if the first control module has been using the open loop control routine for a pre-determined period of time during which an input power of the input signal was above a threshold level and of sending the third signal after the first control module has been using the open loop control routine for the pre-determined period of time.

21. The system of claim 18 wherein the second control module comprises filters, the system further comprising a calibration module for generating entries for initializing the filters.

22. The system of claim 21, wherein the first control module is capable of using the entries to initialize the filters in the second control module.

23. The system of claim 18, wherein the first control module is capable of generating a fifth signal capable of being used to modify a second characteristic of the input signal using the open loop control routine and the second control module is capable of generating a sixth signal capable of being used to modify the second characteristic of the input signal using the closed loop control routine.

24. The system of claim 23 further comprising a calibration module for generating a first value representing an amount to modify the first characteristic of the input signal and a second value representing an amount to modify the second characteristic of the input signal, the first value and the second value for use by the first control module.

25. The system of claim 24, wherein the first control module is capable of using the first value to generate the second signal and of using the second value to generate the fifth signal.

26. The system of claim 24, wherein the calibration module is capable of updating the first value and the second value based on outputs of the second control module.

27. The system of claim 24, wherein the calibration module is capable of generating the first value and the second value to account for at least one non-linearity introduced by the stabilization module.

28. The system of claim 23, wherein the first characteristic of the input signal comprises an amplitude of the input signal and the second characteristic of the input signal comprises a phase of the input signal.

29. The system of claim 18, wherein the second control module is capable of generating the fourth signal to account for a non-linearity introduced by the stabilization module.

30. The system of claim 18, wherein the second control module is capable of receiving a first error signal and a second error signal and of adjusting the first error signal and the second error signal to compensate for a non-linearity present in the first error signal and the second error signal.

31. The system of claim 18, wherein the first control module accounts for a non-linearity introduced by the stabilization module in generating the second signal.

32. An article of manufacture for use with a stabilization module for stabilizing an amplifier, the article comprising:

means for receiving a first signal representative of an input signal received by the stabilization module, for generating a second signal capable of being used to modify a characteristic of the input signal using an open loop control routine, and for sending a third signal capable of being used to pass control to a second control module; and

means for generating a fourth signal capable of being used to modify the characteristic of the input signal using a closed loop control routine.

33. A method for stabilizing an amplifier, the method comprising:

receiving an input signal with a stabilization module comprising an open loop control system and a closed loop control system;

using the open loop control system to modify a phase of the input signal and minimize a phase non-linearity of the amplifier and to pass control to the closed loop control system;

transitioning from using the open loop control system to using the closed loop control system to modify the phase of the input signal and minimize the phase non-linearity of the amplifier.

34. The method of claim 33 further comprising transitioning after using the open loop control system for a pre-determined period of time during which an input power of the input signal is above a threshold level.

35. The method of claim 33 further comprising using the open loop control system to initialize a filter in the closed loop control system based on an output of the open loop control system.

36. A stabilization module for stabilizing an amplifier, comprising:

a first control module for receiving a first signal representative of an input signal received by the stabilization module, for generating a second signal capable of being used to minimize a phase non-linearity of the amplifier by modifying a phase of the input signal using an open loop control routine, and for sending a third signal capable of being used to pass control to a second control module; and

the second control module for generating a fourth signal capable of being used to minimize a phase non-linearity of the amplifier by modifying the phase of the input signal using a closed loop control routine.